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# Dark Patterns: How Interaction Design Turned to Deception

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**Dark Patterns: How Interaction Design Turned to Deception**

Since the development of the first computing machines post-World War II, rapid advances in computing speed and technology have led to significant changes in the design goals of computing systems and their intended use. These changes in technology have driven equally rapid developments in interaction design paradigms, culminating in a focus on user psychology and deception within the past decade that sacrifices usability for profit.

Early computers were large, unwieldy, and expensive to use. The first general purpose programmable computer, ENIAC, occupied an entire floor and required its own air conditioning unit. ENIAC's interface was comprised of multiple panels of plugboards and switches that needed to be set in specific configurations to load a program. Calculation results were printed out on paper or ticker tape and needed to be interpreted. (Grudin) The interaction design choices of the pre-transistor era were limited to the efficient placement of programming switches and display boards. Every design choice was made with the goal of improving computer uptime and efficiency. If the programmers could input programs into the computer more efficiently, more calculations could be completed in a shorter period. Saving electricity and material costs for whichever scientific institution was running the machine.

As computers transitioned from the large calculators of the late 1940's and early 1950's to the comparatively miniature computer terminals of the 1960's. The plugboard and ticker tape interfaces of early computers such as the ENIAC were replaced by digital displays and keyboards. The MIT-developed LINC was an early example of a single operator computer that used a monitor for displaying information and a dedicated keyboard for user input. (Clark)

Research into new modes of computer manipulation and communication continued, and in 1963, Ivan Sutherland designed the first graphical interface—Sketchpad. Initially intended as an interface for computer aided design software, the system demonstrated the possibility for direct manipulation interfaces between human and machine, as well as pioneering the field of computer graphics. (Grudin)

Inspired by Sutherland's developments, Douglas Englebart at the Stanford Research Institute introduced early versions of the computer mouse, text editor, and videoconferencing in an hour-long demo at the Association for Computing Machinery's fall joint computer conference in San Francisco in 1967. The demonstration was the result of a research attempt by Englebart for "augmenting human intellect" by leveraging the computer's "capabilities for manipulating and displaying information that can be of significant benefit to the human in non-mathematical processes of planning, organizing, studying etc." According to Englebart, "Every person who does his thinking with symbolized concepts (whether in the form of the English language, pictographs, formal logic, or mathematics) should be able to benefit significantly." (Englebart)

Englebart's vision for a widespread use of computers as an aid to human decision making, instead of simply a mathematical tool, laid the groundwork for the adoption of the personal computer over the next 20 years. In 1973, Xerox's Palo Alto research center built the compact, single user, Alto workstation utilizing both Englebart's mouse design and a newly developed graphical user interface that mimicked a desktop. Eight years later in 1981, Xerox released the successor to the Alto, the Star workstation, which included the mouse and the interface from the Alto, as well as email and networking capabilities. By 1984, personal computers had flooded the consumer market, including the Commodore 64, LISP, IBM Personal Computer, and the Apple Macintosh. (Grudin) True to Engelbart's vision, computers were no

longer limited to use as a technical tool but were accessible to and affordable by the average person.

In 1987, a few years after the launch of the Macintosh, Apple published a book of guidelines for their interface containing ten general design principles used in its development. These were later refined by Jakob Nielsen and Rolf Molich in a 1990 paper, “Improving a Human Computer Dialogue.” Revised again in 1994, the ten heuristics are: Visibility of system status, match between the system and the real world, user control and freedom, consistency and standards, error prevention, recognition, flexibility and efficiency of use, aesthetic and minimalist design, help users recognize, diagnose, and recover from errors, and provide help and documentation. (Neilsen)

Within ten years, users were faced with a large array of computers, websites, and services all vying for their attention. Certain companies, however, used a blend of marketing tricks and clever design to attract customers and ensure their success. In 1996, Hotmail’s addition of an advertisement at the bottom of every message, “PS I love you. Get your free email at Hotmail.” rocketed the company’s user base from 20,000 users a month after launch to 12 million users by the time they were acquired by Microsoft for almost $400 million in 1997. (Penenberg) By leveraging their existing user base for free advertising, Hotmail was able to fuel explosive brand recognition with one simple design change, an intoxicating result.

This decision to force user advertisement for the sake of growth might have seemed harmless at the time, but the positive result of Hotmail's advertising campaign demonstrated to new and existing companies the monetary value of user attention and viral expansion. As the World Wide Web continued its growth from 400 million users in 2000, to almost 2 billion users in 2010. (Roser, Ritchie and Ortez-Ospina) Internet companies turned to Nielsen's existing user-focused design heuristics as a guidebook on how to attract and maintain user attention. Adapting

existing marketing and sales techniques to fit the digital world, with specific focus on attracting and retaining users and attention.

Dark patterns are the term for the design practices which attempt to trick or mislead a user into performing actions that directly benefit the designer or operator of the system by manipulating or tricking the user. (Brignull) The techniques fall into 5 broad categories of operation. All of them take advantage of research into user psychology and the subversion of Nielsen's principles to accomplish their goal in different ways. The categories are nagging, obstruction, sneaking, interface interference and forced action. (Gray, Kou and Battles)

The nagging pattern involves limiting the user to a single choice by redirecting the non-optimal choice into future interactions with the system. These designs often take the form of dialogue boxes that appear at inconvenient times and will only go away when the user selects the desired response. Instagram is one of many apps that prompts the user repeatedly for permission to enable notifications. Unless the user chooses to be notified, the prompt returns every time the app is opened. After enough prompts, the intention is that the user will choose to turn on notifications either to get rid of the annoying prompt, or due to an error. Instagram is intentionally limiting the user's freedom to get a desired result. The notification access then gives Instagram a more direct way to nag the user into spending their time on the app. The nagging behavior is often unwanted and intentionally difficult to stop.

Obstruction-style patterns attempt to dissuade certain choices by making them time consuming or intentionally confusing to accomplish. By far the most common example of obstructive design is in the unsubscribe user flow for online subscription-based services. Once the user has signed up for a subscription, encouraged by other dark pattern techniques, the service will make the unsubscribe process as difficult as possible to retain the user's business. For example, an unsubscribe form or button does not exist on the New York Times website. To unsubscribe, users

must talk to a customer representative first, who may try to stall the cancellation process further. Newspapers and other subscription services like the Times are built with these subscriber retention strategies in mind. Preventing even a small portion of subscribers from leaving by creating a needlessly complicated process is a worthwhile strategy to help retain customers.

Sneaking patterns hide relevant actions or information from the user to coerce them into picking the optimal choice. Key details on pricing or privacy policies are often hidden until the last possible moment. In one example of the e-commerce sneaking dark pattern, the online ticket sales platform Ticketmaster does not immediately show the cost of the fees associated with purchasing a ticket on their website, replacing a number with the intentionally ambiguous "fees." Delaying the actual price until the checkout screen is a widespread practice among e-commerce sites, allowing them to advertise for lower prices and incentivize users to spend more. A 2020 survey of StubHub users found that consumers were willing to spend up to 15% more on tickets with hidden fees when compared with upfront fees. (Blake, Moshary and Sweeney) Sneaking information under a user's notice is beneficial because it allows the business to mislead the user about privacy, usage conditions, or tracking.

Interface interference patterns involve positioning interface elements in ways that lead the user towards picking the desired action. This manifests in highlighting the "appropriate action" to draw the user's attention, mislabeling buttons to trick the user into choosing a desired option, preselecting options, or inappropriately sizing elements to draw attention towards or away from them. This pattern takes advantage of user inexperience, misplaced consistency, visibility, and choice architecture to gain the user's acceptance of an action while shifting control from the user towards the designer or business. Cookie consent requests are a popular example of this pattern. Many cookie notifications have highlighted the "accept all cookies" button intentionally in the knowledge that most users will gravitate towards a larger or more visible

button, and thereby give blanket consent to unknown storage and trackers. (Gray, Santos and Toth)

Forced Action patterns lock software functionality behind a wall of seemingly harmless but potentially unwanted actions. Users are often forced to sign up and share an email address or other data to use a website or service. This pattern is common in many online newspapers and social media platforms. These services only partially obstruct their content behind a wall to incentivize the user to volunteer information or pay for access to the rest of the service's content. The information requested is often not strictly necessary to provide the content but is useful or profitable to the service.

The current trajectory of human computer interaction research and the emergence and proliferation of dark patterns raises several concerns about the influence that user interface designers have in our increasingly connected and digital society. In the decades before the internet and widespread computers, a designer's impact was limited to the direct interaction between the user and the product. With ubiquitous digital platforms, a greater understanding of user psychology, e-commerce platforms, and fast, iterative, testing methods. The digital interface design of today has a more potent ability to quickly affect the lives and pocketbooks of users in potentially predatory and unwanted ways. In the case of dark patterns, this ability is often used to attract and retain users for the purposes of gaining profit rather than creating experiences and displays that are focused on providing what the user wants or needs. The continued proliferation of the profit-driven design model warrants an ethical shift among the design community back to the user-first design heuristics of Norman and Nielsen. In addition to the ethical design frameworks, consumer protection legislation has taken aim at deceptive design techniques. Including the European Union’s General Data Protection Regulation (GDPR) and California’s Consumer Privacy Act. While the GDPR has forced websites to implement cookie notification

strategies, the strict enforcement of the consent barrier in the law has largely been ignored, as evidenced by dark patterns that do not meet the criteria of "intelligible, accessible to the user, using clear and plain language, not unnecessarily disruptive to the use of the website." (Gray, Santos and Toth) Along with the European Union, the Federal Trade Commission and French national data regulation board (CINL) among others, have begun to take notice of the deceptive design practices, with the CINL fining Facebook and Google a combined $238 million. (Liu, Hogan and Iannapollo)

Both legislators and design ethicists are beginning to understand the power of these deceptive tricks and incentivize a shift in ethical standards to more user focused design practices. The trajectory of interface design over the long history of computers demonstrates that designers and companies will leverage many tricks that have been proven to increase profit or click through rate. However, when used correctly, appropriate design also has the power to transform the ways that people share ideas and interact with each other and the digital landscape.

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